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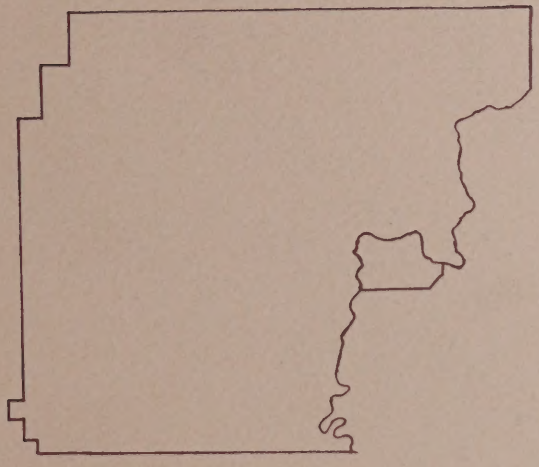
FINAL REPORT

SUFFIELD EVALUATION COMMITTEE

RELATING TO EVALUATION OF THE

GAS RESOURCES OF THE SUFFIELD BLOCK

OCTOBER, 1974



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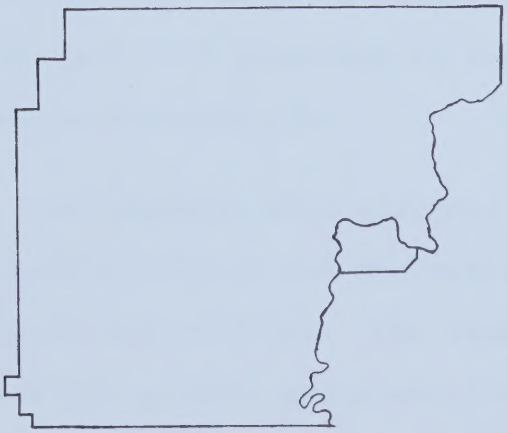

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SUFFIELD EVALUATION COMMITTEE

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MINES AND MINERALS

Suffield Evaluation Committee

403/429-3219

Petroleum Plaza North Tower
9945 - 108 Street
Edmonton, Alberta, Canada
T5K 1G8

Honourable Bill Dickie, Q.C.,
Minister of Mines and Minerals,
Edmonton, Alberta.

October 31, 1974

Sir:

We have the honour to present, pursuant to section 7 of the Suffield Evaluation Regulations, the final report relating to the evaluation of the gas resources of the Suffield Block. The results of the evaluation of the 77 wells together with the pertinent well data are presented in detail in the report dated September, 1974 submitted to the Suffield Evaluation Committee by Last, Kloepfer Ltd.

Gas reserves were assigned to each formation evaluated in the Suffield Block and the reserves are classified as proven, probable and possible. The sales gas reserves determined by the evaluation program are summarized.

SUFFIELD BLOCK SALES GAS RESERVES IN BCF

Formation	Proven	Probable	Possible	Total
Milk River	1,595	399	-	1,994
Medicine Hat	282	88	35	405
Second White Specks	98	-	59	157
Bow Island	7	-	34	41
Glauconitic	18	-	110	128
Totals	2,000	487	238	2,725

These reserve figures compare favourably to the gas reserves forecast in the Resource Evaluation Study of December, 1972 with one exception. The Medicine Hat formation was found to be disappointing and its reserves now appear to be less than 25% of the 1972 forecast. A comparison of the 1972 sales gas forecast for the Suffield Block with the reserves now estimated appears in Table 4 of the final report.

The drainage occurring from the Atlee/Buffalo pool within the northerly portion of the Suffield Block due to gas production since 1969 north of the Block has been estimated at 5 BCF to the end of 1973. Drainage does not appear to have occurred to any marked degree from other pools within the Block to the present time.

Respectfully submitted,

H.H. Somerville, Chairman

J.K. Gray, Vice-Chairman

H.L. Hogge, Member

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INTRODUCTION

The Suffield Block, also known as the British Block, is an area of some 644,000 acres, lying generally to the west of the South Saskatchewan River and to the north of the City of Medicine Hat (Map 1). The Block is used primarily as a military training area and a defence research experimental area. British armoured training units presently utilize some 65% of the Block for annual spring-through-fall training manoeuvres.

The surface rights within the Block were acquired by Canada through expropriation proceedings in 1941 and are still owned by the Federal Government. The expropriation by Canada did not extend to the minerals underlying the surface of the land. However the nature of the research operations and military training conducted by the Governments of Canada and the United Kingdom precluded entry on the surface of the land for development of the minerals.

In recent years production of natural gas has been increasing from areas adjacent to the Block. This situation was drawn to the attention of the Alberta Government and in October of 1972 the Honourable Bill Dickie, Q.C., Minister of Mines and Minerals, commissioned a comprehensive feasibility study of the natural resources occurring within the Block. For the purpose of making the feasibility study, the Honourable Mr. Dickie established a Study Committee with membership from government,

renewable resources, geology, engineering, economics and other related professions. The Study Committee presented its report entitled "A Resource Evaluation - Suffield Block - December 1972, prepared for the Province of Alberta" (hereafter referred to as "the 1972 Study Report"). The report recommended the need for an evaluation drilling program consisting of some 77 wells to evaluate the natural gas resources in the Block and specifically mentioned the drainage of gas that could be expected through wells producing just outside the boundaries of the Block.

Suffield Evaluation Committee

Alberta Regulation 134/73, filed on May 23, 1973 established the Suffield Evaluation Committee. A copy of the Regulation is attached as Appendix 1. The purposes and objectives of the Committee were to arrange for and to complete the reserves evaluation drilling program consisting of 77 wells recommended in the 1972 Study Report. The Orders in Council appointing the members of the Committee appear as Appendix 2.

Consultant

The petroleum consulting firm of Last, Kloepfer Ltd of Calgary was retained as the Committee's Consultant to assist in the planning, co-ordinating and conduct of the evaluation drilling program and was in charge of the drilling and well testing operations and the obtaining and interpreting of the technical data.

Surface Access

In order to obtain access for drilling the evaluation wells, it was necessary to make an arrangement with the Department of National Defence. A meeting was arranged by the Department of Federal and Intergovernmental Affairs with senior personnel of the Department of National Defence. Permission was obtained for locating and drilling 22 of the wells in the southerly portion and 5 wells in the northeasterly portion of the Block during the summer of 1973. No army operations were then planned for these areas. As most of the remaining 50 wells would be located in areas involved in training manoeuvres of the British armoured units, it was arranged that these wells would be drilled during the winter of 1973-74.

It was a condition of the arrangement that access would, wherever possible, follow existing roads and trails in the Block to ensure a minimum of surface disturbance. The actual location of the access roadway to each well site would be determined in consultation with the Base Commander of the Canadian Forces Base at Suffield.

As an additional safeguard those employed by the Committee would be required to comply with army traffic and safety regulations while within the Block. The army made available to the Committee on an abandoned runway, space for a field office and for storage of casing and equipment.

In the further interests of safety, it was a condition that the wellhead for each of the evaluation wells must be protected in a concrete cellar installed at a depth below the surface to permit a concrete lid to be placed over the cellar and covered with at least two feet of earth.

Natural Gas Ownership

The natural gas rights in 95.47% of the Block are owned by the Province of Alberta. The titles to the natural gas in 3.77% of the lands in the Block were held by the Hudson's Bay Company, while titles to the remaining 0.76% are owned by others including the Federal Government. Recently the mineral titles of the Hudson's Bay Company were transferred to Siebens Oil & Gas Ltd.

When the evaluation drilling program was announced, the Hudson's Bay Oil & Gas Company Limited indicated that it was prepared to contribute a proportionate share of the cost of proving up the gas reserves in the Block. The company explained that it had the right to drill the mineral tracts held by Hudson's Bay Company, which tracts represented some 3.77% of the total acreage of the Block. It was agreed that three of the 77 evaluation wells would be drilled on Hudson's Bay mineral tracts and that the Hudson's Bay Oil & Gas Company Limited would reimburse the Committee for expenditures incurred in drilling, completing and testing the three wells located in sections 8-17-4 W4M, 8-20-6 W4M and 8-20-8 W4M.

Well Sites

When the locations for the wells were initially surveyed, the sites were carefully inspected on the ground and in those instances where interference with natural drainage might occur the site was moved to a more appropriate level location nearby. The names of the wells were prefixed with the words 'Alberta Suffield' for easy identification of the evaluation wells from development wells that would be drilled in the future.

Well Information

In view of the interest in the evaluation drilling program, the Committee decided that none of the well data would be held confidential and the Energy Resources Conservation Board was so informed. As a consequence when well logs, surveys and test data were filed with the Board, they were then available to interested persons at the Board's offices in Calgary.

OPERATIONS

Planning

With the consent of the Department of National Defence to drill some of the evaluation wells during the summer and the remainder during the winter, the Committee decided to conduct the reserves evaluation drilling program in two stages:

Stage 1 - to consist of the drilling of 27 wells in the summer of 1973, and

Stage 2 - to consist of the drilling of 50 wells during the winter of 1973-74.

An invitation was extended to contracting, service and supply companies wishing to participate in the drilling, completion or testing of the wells to make their qualifications known to the Committee's Consultant. A notice was inserted in each of the following newspapers and in Oilweek. The notice appears as Appendix 3.

NEWSPAPER	ISSUE
Calgary Albertan	June 15, 1973
Calgary Herald	June 15, 1973
Edmonton Journal	June 15, 1973
Lethbridge Herald	June 15, 1973
Medicine Hat News	June 16, 1973
Red Deer Advocate	June 15, 1973
Oilweek	June 25, 1973

Competitive tenders were invited from interested contractors for major services and supplies for each segment of the program. The Stage 1 tenders were requested in June, 1973 and the Stage 2 tenders in August and September of 1973. The returned bids were analyzed by our Consultant and awards were made by the Committee on the basis of the lowest acceptable bid for each service or supply. Those awarded contracts for Stage 1 are listed on Appendix 4, and for Stage 2 are listed on Appendix 5.

Farries Engineering Ltd was retained to provide supervision for field drilling operations and Reimer Engineering Ltd was retained to supervise the completion of the wells. Core Laboratories - Canada Ltd was selected to provide the core analysis service and the gas analyses were awarded to Chemical and Geological Laboratories Ltd.

Material Supply and Communications

To facilitate both the supply of materials and communications, an office and storage yard was set up on the old airstrip at Canadian Forces Base Suffield. This office was manned 24 hours per day, seven days per week, while the drilling was in progress. Clerical staff maintained inventories of casing, tubing and other materials necessary for the large scale drilling operation. Truck loading was supervised to ensure that proper equipment was transported to each well site and directed on to the proper roads through the Block. This was most important when Military or Research activities were taking place.

Throughout the program, the most difficult problem was to effect a working compatibility between a multi-rig gas well drilling and evaluation program, the tests and trials conducted by the Defence Research Establishment Suffield (DRES), and the Military training carried out jointly by Canadian Forces Base Suffield (CFB Suffield) and the British Army Training Unit Suffield (BATUS). Both DRES and BATUS activities resulted in various sections of the range being closed for periods of up to three weeks. The Military training involved live ammunition firing by tanks, artillery and infantry, while DRES activities involved various exotic gas and explosives trials. In both cases, personnel safety was of top priority.

With the kind co-operation of the DRES and CFB personnel,

the Suffield Evaluation Committee was able to use the radio communication system which existed throughout the Block. Coverage was unlimited and all rigs and supervisory personnel were in constant communication with our base office, DRES operations control and the CFB range control. As a result, the drilling supervisory staff was able to continuously monitor the field activities. Without this radio network, our drilling program would have taken considerably longer to complete.

The Committee was also supplied with copies of Block activity calendars, so that, along with daily reports by the supervising engineer, the drilling rig movements could be properly co-ordinated to avoid either rig down time or unwarranted interference with the various military and defence research activities.

A further consideration was the presence of PFRA operated grazing pastures along the eastern side of the Block. Up to 7,000 head of cattle were located on these ranges, so cattle guards were installed at key traffic points.

Consequently, the 77 well drilling program was carried out with no disruption of drilling, completion or testing activities. The program as a whole, successfully demonstrated that exploratory and/or development drilling can be carried out on the Suffield Block, in association with DRES activities, military training and PFRA grazing.

Terrain and Access

The Block is an uninhabited area, with only four graded main roads in the 1,000 square miles. The graded and graveled roads total only 97 miles and are shown on Map 2.

The rest of the access system consisted of bladed prairie trails marked off in squares and circles to accommodate various DRES test activities. These trails served mainly as a source of geographic location, to direct traffic to the various drill sites, and for this purpose proved invaluable.

The summer program proceeded without any particular access difficulties since it was confined mainly to the DRES area. Only the Middle Sand Hills area, in the northeast corner of the Block, presented access problems during this Stage. The sites for two of the wells were moved to permit easier access but still provide evaluation data.

The winter program took place in the heart of the Block and the terrain proved to be extremely difficult. Although relatively flat to the south and west, the balance of the Block is broken up by a series of deep, rugged coulees. The coulees, besides presenting steep banks, boulders and winding trails, also served as traps for a series of alkali lakes, which presented an impenetrable barrier to heavy traffic.

The bladed trails, being graded about one foot below prairie

level, and with the edges banked with rocks and debris, proved to be a perfect snow trap. The trails could be plowed out, but created further problems with the next windstorm filling the trail with snow to an even greater depth. Alternate routes on the prairie proved treacherous, due to an abundance of boulders, badger holes, and old water courses.

In summary, the terrain and access for the winter 50-well program proved to be extremely difficult due to the excessive snow and wind. Cats and graders were in constant use for towing and snowplowing from November 15th to the end of the winter.

Drilling

The drilling equipment as supplied by the contractor for Stage 1 consisted of two shallow depth highly portable rigs, specifically designed for drilling the shallow gas zones of southeastern Alberta.

The first rig drilled 19 Medicine Hat tests between July 9 and September 3 in 1973, averaging 3 days per well. Depths of wells to this formation range from 1400 to 1600 feet.

The second rig drilled five Second White Specks and three Medicine Hat tests between July 29 and September 8, averaging 5.1 days per well. The Second White Specks wells are approximately 600 feet deeper than Medicine Hat tests, thus accounting for the longer average time. Drilling of the Stage 1 wells was

completed in 97 rig days.

After the experience of the Stage 1 program, it was decided that four rigs should be employed to complete the Stage 2 program in a reasonable length of time so as to have the completions and well testing and the evaluation finished during the summer of 1974. The work was divided between two contractors, Whitco Drilling Ltd which again supplied two shallow rigs to drill 34 holes, and Kenting Petrolia Drilling Ltd of Calgary, which supplied two rigs to drill 16 wells in the 2300 to 3600 foot depth range.

The first rig on the Stage 2 program commenced operations on October 16, 1973, and the last rig was released on February 19, 1974, for a total of 352 rig days.

The wells drilled in the evaluation program are listed on Table 1 and shown on Map 2. A total of 154,485 feet of hole was drilled during the period July 9, 1973 to February 19, 1974. A detailed breakdown of drilling statistics by rigs is given in Table 2.

Water Supply

The absence of accessible fresh water was a major problem for both the Stage 1 and Stage 2 drilling. It had been anticipated that water could be obtained from the South Saskatchewan River, but it was found that there were only two places where it was

possible to reach the river's edge. Because of distance, these two sites served only a very limited part of the program. After the various surface ponds had been exhausted, or were too far from the drill sites to be practical, alternative water sources had to be found.

For Stage 1, a water well was drilled and completed at 135 feet in section 5-19-4 W4M testing on pump at the rate of 60 GPM (2500 BPD). The well was used for drilling and completion operations in the northeasterly portion of the Block.

Prior to the start of Stage 2, a water well test program was initiated in the northwest sector of the Block. An unsuccessful test to 510 feet was drilled and abandoned in section 28-19-7 W4M. A second test was drilled and completed at 335 feet in section 32-18-7 W4M. After the installation of pumping equipment an initial rate of seven GPM (300 BPD) was established. Due to the low productivity this well was unable to effectively contribute to the water supply in the winter.

During December, January and February, surface water was very difficult to find, as most of the ponds were frozen to the bottom. Water from the alkali lakes in the Block was suitable for only a portion of the drilling needs. Fresh water had to be obtained for cementing purposes often necessitating long hauls.

Cellars

Block access provisions required that concrete cellars be

installed so that the wellheads would be below ground level. These cellars were installed after the drilling phase and prior to well completion. In installing a cellar, an area around the well was excavated and a six-foot deep cement ring installed around the well. The ring consisted of two sections, a four-foot section at the bottom with a two-foot section placed on top. The wellhead equipment was installed so that the top of the bottom section of the cellar and the wellhead were about twenty-four inches below the ground surface.

Prior to perforating and fracturing an eight foot long, four inch diameter riser was temporarily installed in order to permit completion operations to occur above ground level. After a well had blown back for clean-up the riser was removed and the wellhead installed. During this phase of the operation the crew members were required to work below ground level in a confined space with relatively heavy equipment.

Before testing the wells, risers eight feet high and two inches in diameter were installed to facilitate control of the wells above ground level. After testing of the wells, the risers and the two-foot top portion of the cellars were removed. The four-foot portion of each cellar was then covered with a reinforced concrete lid and two feet of earth.

In view of the safety hazards to personnel and expense involved in completing the wells below ground level, testing of a

different type of protective device is now in progress, which if proven successful, will permit wellheads to be installed just below the surface and covered with a protective metal grating.

Perforating

Initially the Milk River zone was perforated over the entire indicated net pay section using 20 to 40 select fire jets or bullets. It was found that wells with 20 or less perforations exhibited improved flow rates and normally fractured without premature sandoffs. Subsequently the majority of the Milk River wells were completed using 20 or less perforations.

The Medicine Hat and Second White Specks zones were perforated over the entire indicated pay using a density of two perforations per foot. Because of the relatively thin sections involved the total perforations were generally less than 20 per zone. The Bow Island and Glauconite zones were selectively perforated from the log indicated pay.

Fracturing

The majority of the fracture treatments in the Suffield program used fresh water with three to five percent potassium chloride added to prevent clay swelling. Carbon dioxide was normally added at 250 cubic feet per barrel to aid in the rapid cleanup of the fracture fluid. Sand used in fracturing the Milk River, Medicine Hat and Second White Specks zones ranged from 30,000 to 50,000 pounds, with mesh sizes of 20-40; 10-20; 8-12 and 4-8.

The Bow Island well and the two wells completed in the Glauconite were not fractured.

Testing

Testing of the wells was conducted over the period September, 1973 through June, 1974. The major field problem encountered was that of access caused in the winter by snow drifting and in the spring by muddy roads and trails. Testing in May and June had to be fitted in between scheduled military activities.

Gas Quality

Gas produced from the Cretaceous pools in the Block can be described as dry sweet gas with the following typical compositions in percentage by volume. The heating value per standard cubic foot is also shown.

	F O R M A T I O N				
Constituent	Milk River	Medicine Hat	Second White Specks	Bow Island	Glauconite
Nitrogen	3.4	3.5	5.3	7.0	4.4
CO_2	-	1.1	0.3	1.8	1.9
Methane	96.4	95.1	94.1	90.8	92.0
Ethane	0.2	0.3	0.3	0.4	1.4
Propane Plus	-	-	-	-	0.3
B.T.U.	960	970	958	939	977

Processing of this gas for sale will require only dehydration and compression.

Completions

The evaluation drilling program resulted in the completion of 76 capped gas wells and one potential gas well.

Sixty-five of the wells are dual zone completions, 38 being completed in the Milk River and Medicine Hat, 22 in the Milk River and Second White Specks and 5 in the Medicine Hat and Second White Specks formations. Eleven of the wells are single zone completions, 5 being completed in the Milk River, 2 in the Medicine Hat, 2 in the Second White Specks, 1 in the Bow Island and 1 in the Glauconitic formation. The potential gas well when completed in the Glauconitic proved non-productive. It however encountered natural gas in the Medicine Hat and stands as a potential gas well from that formation.

Table 1 shows the formations in which the wells were completed and the potential formations from which gas may be produced.

Wellsite Reclamation

When testing of the wells was completed, the disturbed surface was reclaimed as nearly as possible to its former natural contour. The wellheads of 75 of the wells are enclosed in cellars covered with two feet of earth and at each of these wells, a concrete marker bearing the name of the well has been placed at ground level. The other two wells, 6-16-19-4 and 6-8-17-4, are located in areas out of bounds to military travel. The wellheads for these

wells have been installed above surface and as a precaution against livestock, have been fenced.

For matters relating to wellsite reclamation, CFB Suffield appointed as its agent, Dr. W. E. Stevens of the Federal Department of Environment. One suggestion was that no rehabilitation be attempted, and that the sites soon would be covered with annual plants which would later be replaced by perennial grasses and shrubs from the surrounding areas. As an experiment, six of the sites selected in different soil types were left unseeded. If this method of revegetation fails, the sites can be seeded at a later date. The remaining sites have all been seeded to grass.

Program Costs

Major materials and services for the evaluation drilling program were acquired through competitive bidding. Main areas of price reduction were those associated with bulk purchase of materials for the 27 wells in Stage 1 and the 50 wells in Stage 2 and also in the supply of services where continuing use could be made of men and equipment by co-ordinating activities during each Stage. Throughout the program the activities of each contractor and supplier were supervised to ensure that the provisions of the bids were followed.

Separate cost figures were maintained for each Stage and these are summarized.

	STAGE 1		STAGE 2		TOTAL	
	No. Wells	Cost $	No. Wells	Cost $	No. Wells	Cost $
Medicine Hat	22	723,228	21	925,848	43	1,649,076
Average Well		32,874		44,088		38,351
Second White Specks	5	174,020	13	631,722	18	805,742
Average Well		34,804		48,594		44,763
Bow Island			5	278,005	5	278,005
Average Well				55,601		55,601
Basal Colorado			5	301,235	5	301,235
Average Well				60,247		60,247
Mississippian			6	487,854	6	487,854
Average Well				81,309		81,309
Total Cost	27	897,248	50	2,624,664	77	3,521,912
Average Well		33,231		52,493		45,739

The cost of the three wells drilled on Hudson's Bay mineral tracts for the account of Hudson's Bay Oil and Gas Company Limited amounted to $170,839. The Company has made payment of this amount to the Committee thus reducing the cost to the Province of the evaluation drilling program to $3,351,073.

The increase in the cost of the average Medicine Hat test from the summer to the winter program of $11,000 (35%) dramatically illustrates the additional expenditures associated with drilling and completion operations in rugged terrain, serviced by few roads, during one of the most severe winters experienced in the area during the last several years. Similarly the cost of the average Second White Specks test from the summer to the winter program also increased 35%, so it can be assumed that a similar

percentage increase would apply in the winter drilling of the deeper wells.

As well as the increased cost of some $650,000 as a result of winter operations, there was also the additional expense involved in having the wellheads enclosed in the cellars estimated at $270,000, an average of $3,500 per well.

Consultant's Report

The results of the evaluation of the 77 well drilling program together with pertinent well data are presented in detail in the report dated September 1974, submitted to the Suffield Evaluation Committee by Last, Kloepfer Ltd. The evaluation is concerned almost entirely with subsurface data obtained from the wells drilled in the Block, with peripheral control being utilized only to the extent that the interpretation is correctly tied with regional trends.

The members of the Committee have carefully reviewed and discussed all phases of the report with its Consultant and are in agreement with the procedures followed in the interpretation and evaluation. Sections of the Consultant's report on hydrocarbon potential and reserves are summarized.

HYDROCARBON POTENTIAL

The Suffield Block is situated on the crest of the northeast plunging Bow Island Arch. Structural movement in the area of the

Arch appears to have begun as early as late Upper Jurassic and probably continued on a minor and intermittent basis through to Tertiary time. At some time during the Tertiary a major rejuvenation of the Arch occurred. Because of the long established history of positive structural movement, the Arch has served as an important focal point for hydrocarbon accumulation.

The Block contains major gas reserves which are found largely in the Upper Cretaceous Milk River, Medicine Hat and Second White Specks sandstones. Smaller gas reserves have been established or will likely be encountered in the Lower Cretaceous Bow Island, Basal Colorado, Glauconitic and Sunburst/Cutbank sandstones. The possibility of oil reserves in the Glauconitic has been indicated.

Well data obtained during the drilling, completion and testing operations were used to define the reservoir and producing properties of the gas bearing zones within the Block. These properties, combined with the geological interpretation, were used to develop estimates of the productive limits of the indicated gas pools. Based upon these data an appraisal was made of the gas in place and recoverable sales gas reserves of the Suffield Block.

Since the deepest test wells in the evaluation program were drilled only to the base of the Cretaceous, hydrocarbon potential of Paleozoic (deeper) sediments within the Block is still an unknown quantity.

Milk River Formation

The Milk River formation occurs at a depth of about 900 feet and is approximately 300 feet thick. It consists of shale with multiple thin interbeds and laminae of sandstone and siltstone. The gas potential in the formation is largely confined to four separate zones, namely Milk River A-1, A-2, B-1 and B-2 zones. Individual net pay interpretations are presented for each zone in Maps 3, 4, 5 and 6. These net pay maps are based upon consideration of gross resistivity isopachs, log data and production tests.

Because of the relative lack of permeability, delivery rates from the Milk River are low in comparison with other sandstone reservoirs, and a greater density of wells will be required for proper drainage. More than 90% of the Block is indicated to be productive of gas from one or more of the zones in the Milk River (Map 7). Total gas in place for this formation is estimated at 2,790 BCF and recoverable sales gas is estimated at 1,993 BCF.

Generally this reserve would support development. However, because of low productivity, about 10% of the gas reserves will have to be produced in association with development of either the Medicine Hat or Second White Specks formations.

Medicine Hat Formation

The Medicine Hat sandstones occur approximately 100 feet below the base of the Milk River. Along the northern and eastern sides of the Suffield Block the Medicine Hat A Sandstone consists

of up to 40 feet of fine to medium grained sandstones with shale interbeds and contains the Atlee/Buffalo - Medicine Hat Pool (Map 8). It is considered that the Medicine Hat A reservoir, with relatively high porosity and permeability, contains gas that has migrated over distance. Production characteristics are good and recovery should be high.

This sand development in the Medicine Hat A is not present over the southwesterly portion of the Block. Present instead, as an approximate stratigraphic equivalent, is a 50 foot interval of shale with thinly bedded to laminated, fine grained silts and sands that have poorly developed porosities and permeabilities. This portion of the Medicine Hat A containing the Alderson, Princess and Jenner pools (Map 9), holds gas that is thought to be basically non-migratory, having accumulated from enveloping marine shales. The reservoir characteristics of these pools, are much poorer than those of the Atlee/Buffalo - Medicine Hat Pool. Recovery from this zone is estimated at only about 67% as compared to 85% for the Atlee/Buffalo - Medicine Hat.

Approximately 100 feet below the Medicine Hat A is a thin sand lithologically similar to the reservoir shown in Map 8. This unit referred to as the Medicine Hat B sandstone is developed only in the southeasterly portion of the Block. Net pay and distribution is shown on Map 10.

Some 75% of the Suffield Block is interpreted as being gas

productive in either or both the Medicine Hat A and B sandstones (Map 11). About two-thirds of the area covered is from low recovery pools. Total estimated gas in place in the Medicine Hat is 500 BCF. Recoverable sales gas has been forecast at 405 BCF.

The gas contained in the Atlee/Buffalo - Medicine Hat and Medicine Hat B Pools can be developed on its own merit. The reserves estimated for the Alderson, Jenner and Princess Medicine Hat pools will generally because of low productivity, have to be produced in association with either Milk River or Second White Specks development.

Second White Specks Formation

The Second White Specks sandstone is situated 550 feet below the Medicine Hat A Sandstone. The sand is interpreted as a series of marine offshore bars with a maximum gross thickness of 20 feet. The sands may be narrow and elongate to nearly blanket in nature. Where well winnowed and clean, reservoir quality is fair to excellent.

Areal distribution and net pay of the Second White Specks sandstone within the Suffield Block is presented in Map 12. Two separate sand bodies are identified. Reservoir parameters differ. The Alderson pool, in the extreme southwest corner of the Block has net pay up to a maximum of 8 feet. This sand is well developed with good porosity and permeability. The Princess pool, northeast of the Alderson pool, is a thinner reservoir with net pays ranging

to a maximum of 6 feet. Porosity and permeability is less well developed.

Local structure does not appear to affect gas distribution within these reservoirs. Approximately 50% of the area of the Suffield Block is interpreted to contain Second White Specks gas reserves. Total gas in place and recoverable sales gas for the Second White Specks is estimated at 242 BCF and 157 BCF respectively.

The Alderson pool is a good development prospect. The Princess pool cannot be fully developed on its own merit because of low productivity. A large percentage of this pool's reserves will have to be produced in association with either Milk River or Medicine Hat production.

Bow Island Formation

Map 13, "Bow Island Sandstone, Productive and Prospective Areas", shows interpreted net pay for the only productive area of Bow Island discovered in the evaluation drilling program. Several other potentially prospective areas, based on the coincidence of porous sand and positive structure, are also indicated.

Twenty sections of Bow Island gas reserves have been interpreted for the Suffield Block. The gas in place is estimated at 54 BCF and the recoverable sales gas at 41 BCF. The Bow Island discovery is an excellent development prospect. With additional

drilling, it is possible that the Block will prove to contain reserves over several multiples of the area presently considered productive.

Glauconite Formation

Within the Block both oil and gas have been encountered in this unit. Map 14, "Glauconitic Sandstone, Productive and Prospective Areas", indicates some 20 sections of interpreted glauconite reservoir associated with 24 feet of net gas pay encountered in the Glauconitic in the 6-19-18-8 well. The reserves associated with this discovery are estimated at 156 BCF gas in place with recoverable sales gas of 127 BCF.

Glauconitic oil was indicated in the 11-16-20-8 well, a near offset to a Glauconitic oil pool of the Jenner Field to the north of the Block. Samples suggested that the upper 40 feet of the Glauconitic Sand were stained with heavy oil in this well. The sand was tested through casing, but only water was recovered.

Map 14 shows additional areas, based on the coincidence of porosity and structure, which are considered to offer potential for hydrocarbons in the Glauconitic. On a statistical basis, drilling to date, with the discovery of hydrocarbons in two out of six tests penetrating the section, suggests that further opportunity exists within the Block for Glauconitic reserves.

RESERVES

The objective of the evaluation drilling program was a quantitative estimate of the potential gas reserves of the Suffield Block based upon the evaluated data from the drilling and testing operations.

Basic procedures employed in the assignment of reserves to the Block were as follows:

1. The area of the Block as outlined on Map 2 was used.
2. For the Milk River, Medicine Hat and Second White Specks pools the area indicated as productive and the net pay presented on the maps were used to determine productive reservoir volume.
3. For the Bow Island and Glauconite pools the areas within the Block indicated as productive from the geological interpretation of discovery well data (Maps 13 & 14) were used for reserve assignment. No reserves were assigned to other interpreted prospective Bow Island or Glauconite reservoir areas.
4. The following definitions were used to classify the reserves:

   Proven Reserves - Those reserves which are considered to be recoverable to a high degree of certainty, assuming normal depletion methods and operating conditions.

   Probable Reserves - Those reserves in the vicinity of proven.

reserves where there is some degree of engineering or geological risk.

Possible Reserves - Indicated reserves for which available data will not support a higher classification.

5. The classification of reserves as to proven, probable and possible was based upon the Consultant's judgment. In making the classification consideration was given to the geological and producing characteristics of the various zones and to their development potential.

The estimated gas in place and recoverable sales gas for the four zones in the Milk River formation is detailed on Table 3. Total indicated Milk River sales gas amounts to 1,993 BCF. Because of the predictability of the geology and the consistency of well tests, 80% of the indicated sales gas reserve was classified as proven reserves. The remaining 20% was classified as probable reserves because of uncertainties in producing characteristics and field development programs. Proven reserves of 1,595 BCF and probable reserves of 399 BCF result.

The gas in place and sales gas reserves for the various Medicine Hat pools are also detailed on Table 3. Reserve classification for the various pools follow:

(a) Atlee/Buffalo-Medicine Hat - 80% proven, 20% probable

(b) Medicine Hat B - 50% proven, 50% probable

(c) Alderson - 50% proven, 50% possible

(d) Jenner - 50% proven, 50% possible

(e) Princess - 50% proven, 50% possible

Proven Medicine Hat sales gas reserves amount to 282 BCF. Probable reserves were established at 88 BCF with a possible reserve of 35 BCF assigned to this zone. Total indicated Medicine Hat zone sales gas (proven, probable, possible) is estimated at 405 BCF.

The gas in place determination for the Alderson and Princess Second White Specks pools tabulated on Table 3 was based on the following reserve classification.

(a) Alderson - 75% proven, 25% possible

(b) Princess - 50% proven, 50% possible

Proven sales gas reserves for the Second White Specks amount to 98 BCF. Possible reserves of 59 BCF were also assigned to this formation.

The sales gas reserve assignments for the Bow Island and Glauconite zones are also detailed on Table 3. The proven reserves for these zones were based upon an acreage assignment of 1,920 acres and average pool characteristics. The remainder of the reserves indicated for these two pools was classified as possible. Proven Bow Island reserves are estimated at 7.4 BCF. Proven Glauconite reserves amount to 18 BCF. The possible Bow Island reserves are 34 BCF and possible Glauconite reserves are estimated at 110 BCF.

Of the total indicated 2,725 BCF of sales gas reserve, approximately 2,000 BCF or 73% is classified as proven reserves, 487 BCF

or 18% is classified as probable reserves and 238 BCF or 9% is classified as possible reserves.

Drainage

Throughout the drilling program, our Consultant carefully observed the initial pressures in wells drilled inside the boundaries of the Block in order to appraise whether gas was being drained through wells producing just outside the boundaries. It was found for evaluation wells drilled inside the north boundary of the Block in the Atlee/Buffalo pool that the pressure data indicated a decline from the initial reservoir pressure. Production from the pool had commenced in 1969 through wells just north of the Block.

The indicated decline in reservoir pressure for this pool north of Township 18 suggests drainage of 5% of the initial gas in place. The drainage to the end of 1973 is estimated at 5 BCF.

No other serious drainage could be interpreted for other pools in the Medicine Hat formation. An analysis of the initial reservoir pressures for the four pools in the Milk River and the two pools in the Second White Specks formation indicated that drainage has not occurred to any marked degree to the present time.

RESERVES COMPARISON WITH 1972 STUDY REPORT

Of necessity, the evaluation of the hydrocarbon reserves contained in the 1972 Study Report was entirely interpretative and

based on the extension into the Block of geological and engineering interpretations and trends obtained from subsurface control peripheral to the Block. The Suffield Evaluation Drilling Program provided the data for an evaluation based upon Block subsurface control, peripheral control being utilized only to the extent that the interpretations were correctly tied with regional trends.

Table 4 shows the comparison of the reserves estimated in this study to those forecast for the Block in the 1972 Study Report. The current estimates of 2,725 BCF of indicated recoverable sales gas reserves compares to the 4,092 BCF forecast of ultimate recovery developed in the 1972 study.

The Milk River reserves estimated following the evaluation drilling program are, both on a per section and total Block basis, consistent with earlier projections of Block reserves.

The sales gas reserve now estimated for the Medicine Hat formation is only about 25% of the level projected for this formation in the 1972 study. The major reduction in reserves forecast for the Medicine Hat is composed of the following factors:

1. 25% of the Block area is indicated as non-productive from this formation.
2. The gas in place in MCF per acre foot is approximately 50% of the 1972 forecast. This difference is attributable to the lower porosity and higher water saturation now considered as representative within the Block.

3. The average net pay is about 10% less than estimated previously.
4. The average recovery factor is approximately 10% less than the 1972 forecast, and reflects the low deliverability of the Alderson, Jenner and Princess pools within the Block.

The sales gas reserve for the Second White Specks formation is consistent with the 1972 estimate. The productive area in this zone is larger, however this is offset by lower gas in place per acre foot again reflecting lower porosity and higher water saturation.

The 169 BCF of gas estimated for the Lower Cretaceous pools compares to the 400 BCF forecast in 1972. There is still present on the Block sufficient undrilled Lower Cretaceous potential to surpass the 400 BCF projection.

ACKNOWLEDGEMENTS

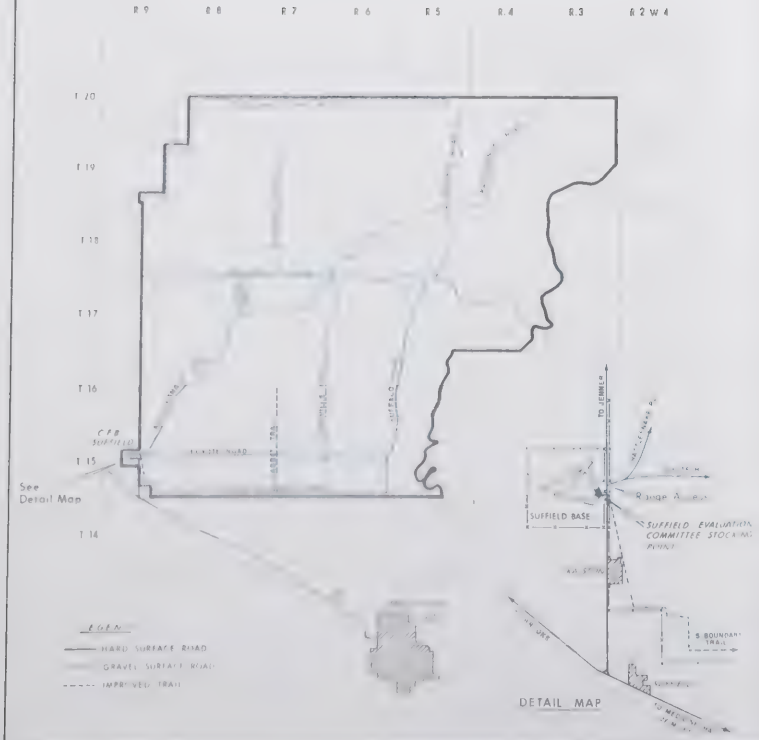
The Committee received sincere co-operation from the Base Commander and personnel of the Canadian Forces Base-Suffield and from the staff of the Defence Research Establishment-Suffield. Special thanks are also extended to Last, Kloepfer Ltd, to the drilling contractors and to those providing services and supplies for the evaluation drilling program.

ALBERTA
PEACE RIVER
GRANDE PRAIRIE
EDMONTON
RED DEER
CALGARY
SUFFIELD BLOCK
MEDICINE HAT
LETHBRIDGE
LOCATION MAP
0 50 100
MILES

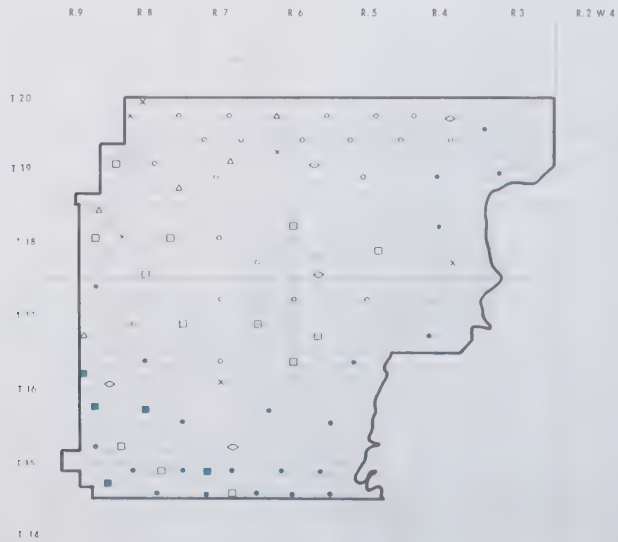
MAP 1

SUFFIELD EVALUATION COMMITTEE

BLOCK ACCESS



EVALUATION WELL LOCATIONS



TOTAL DEPTH	STAGE 1	STAGE 2	WELLS
MEDICINE HAT	•	○	43
SECOND WHITE SPECKS	■	□	18
BOW ISLAND		◇	
BASAL COLORADO		△	
MISSISSIPPIAN		×	

MAP 2

BLOCK ACCESS &
EVALUATION WELL LOCATIONS

MAP 2

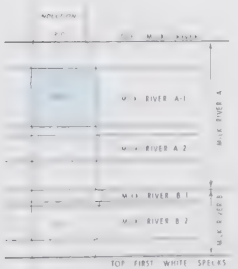
R 9 R 8 R 7 R 6 R 5 R 4 R 3 R 2 W 4

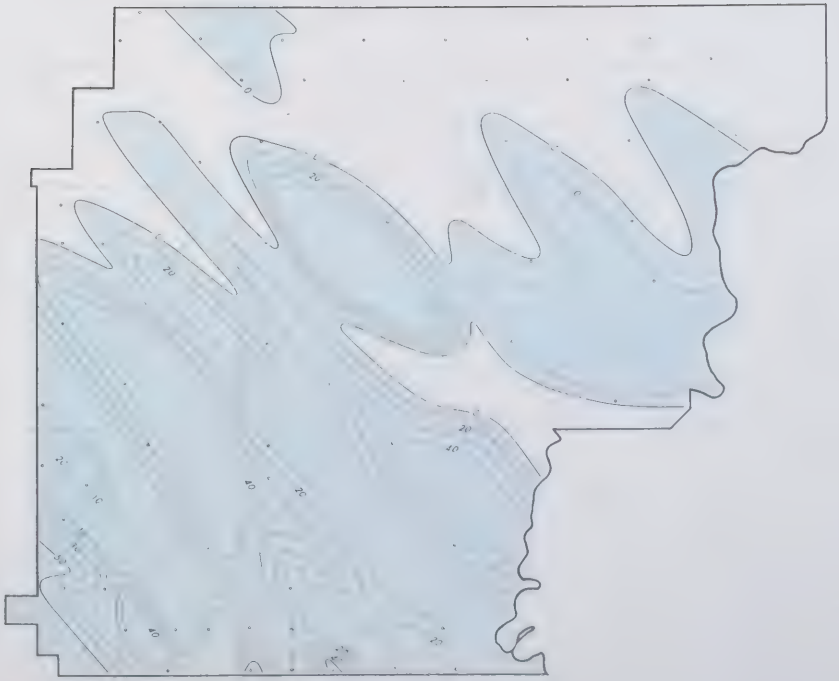
T 14

NOTES

1. Pay derived from a combination of logs
2. All evaluation wells were drilled through Milk River Formation

6-33-16-6 W4





SUFFIELD BLOCK OUTLINE

SUFFIELD EVALUATION COMMITTEE

MILK RIVER A-1 ZONE
NET PAY ISOPACH

CONTOUR INTERVAL 10

MAP 1

THESSEN MAPPING LTD

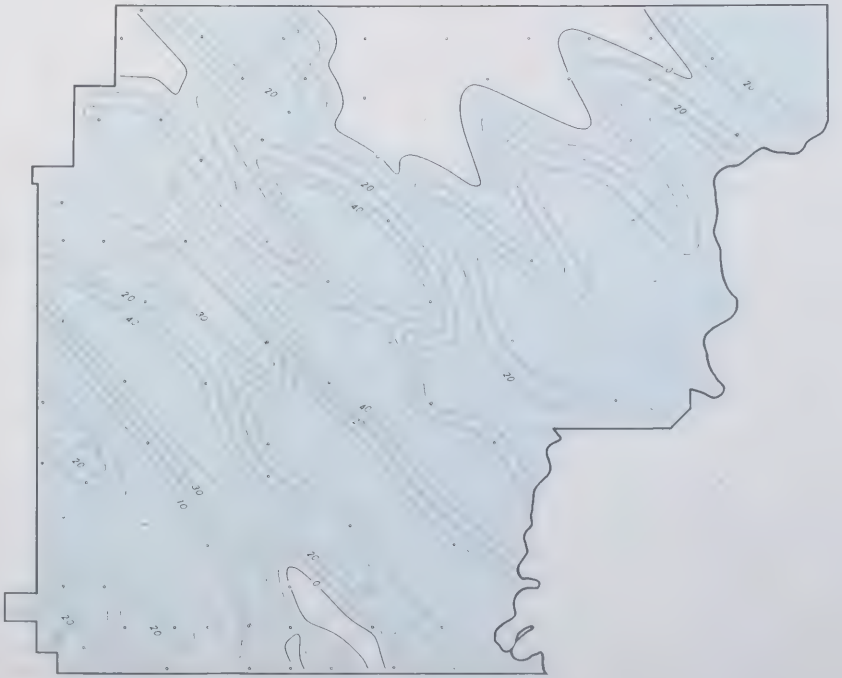
R 10 R 9 R 8 R 7 R 6 R 5 R 4 R 3 R 2 W4

NOTES

1 Pay derived from a combination of logs

2 All evaluation wells were drilled through Milk River Formation

6-33-16-6 W4



SUFFIELD BLOCK OUTLINE

SUFFIELD EVALUATION COMMITTEE

MILK RIVER A-2 ZONE
NET PAY ISOPACH

CONTOUR INTERVAL 10

EAST, KOPPER LTD.
Geology by J.N. Fellbury
October '74

MAP 4

HESSEN MAPPING LTD.

R 9 R 8 R 7 R 6 R 5 R 4 R 3 R 2 W 4

T 15

T 14

T 13

T 12

T 11

T 10

T 9

T 8

T 7

T 6

T 5

T 4

T 3

T 2

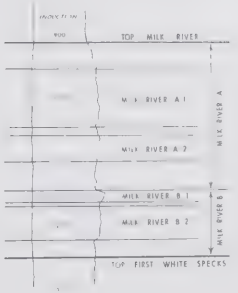
T 1

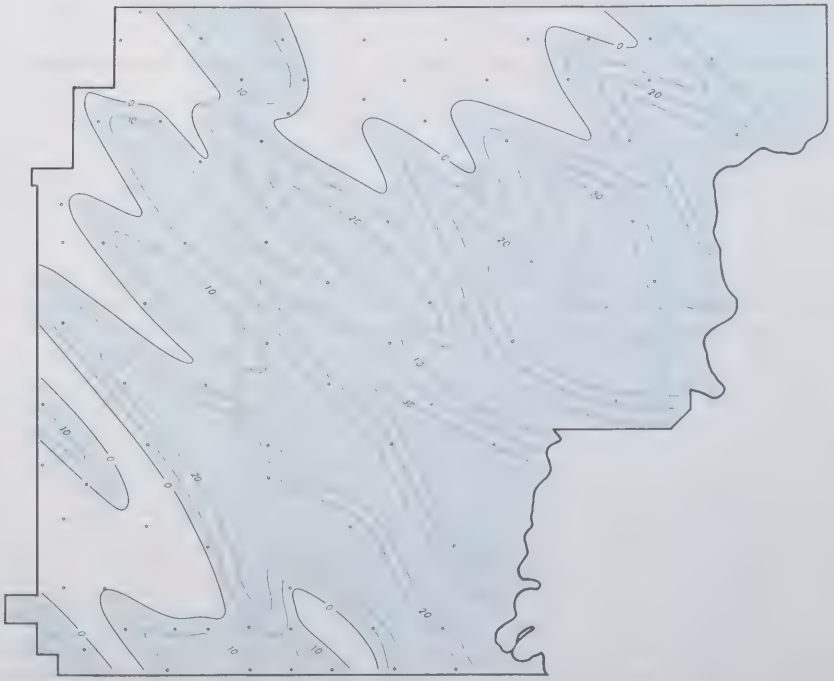
NOTES

1 Pay derived from a combination of logs

All evaluation wells were drilled through Milk River Formation

6-33-16-6 W 4





Oil Well
Gas Well
Dry & Abandoned
Service Well
SUFFIELD BLOCK OUTLINE

SUFFIELD EVALUATION COMMITTEE

MILK RIVER B-1 ZONE
NET PAY ISOPACH

CONTOUR INTERVAL 10'

EAST ALBERTA LTD
Geology by J.N. Tidsbury
October 1974

MAP 5

TIESSEN MAPPING LTD

R 9 R 8 R 7 R 6 R 5 R 4 R 3 R 2 W 4

T 18

T 17

T 16

T 15

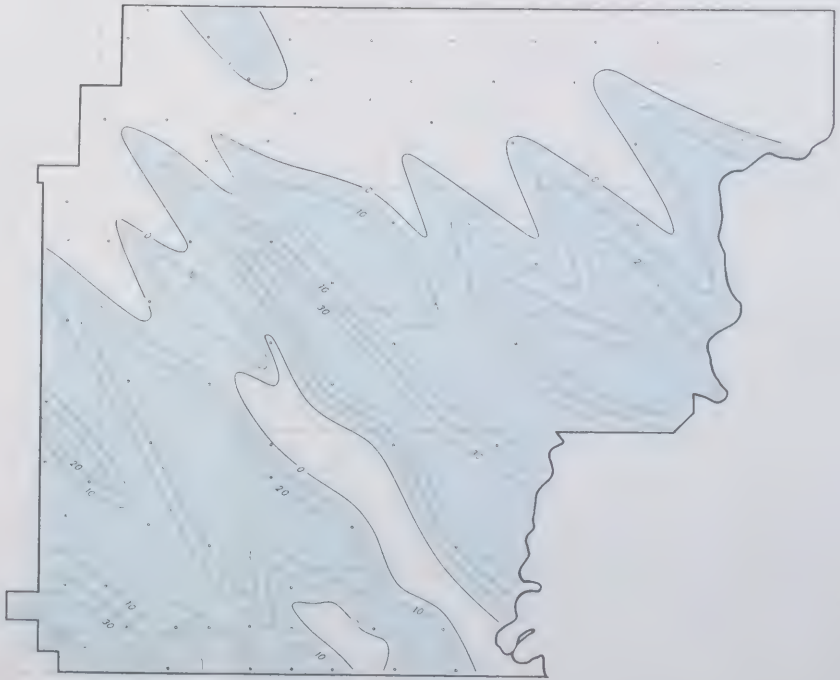
T 14

NOTES

Pay derived from a combination of logs

All evaluation wells were drilled through Milk River Formation

6-33-16-6 W4



SUFFIELD EVALUATION COMMITTEE

MILK RIVER B-2 ZONE
NET PAY ISOPACH

CONTOUR INTERVAL 10

MAP

TIESSEN MAPPING LTD

SINGLE ZONE AREA
TWO ZONE AREA
THREE ZONE AREA
FOUR ZONE AREA

UPPER CRETACEOUS MILK RIVER

SUFFIELD EVALUATION COMMITTEE

MILK RIVER FM. COMPOSITE

October 1974

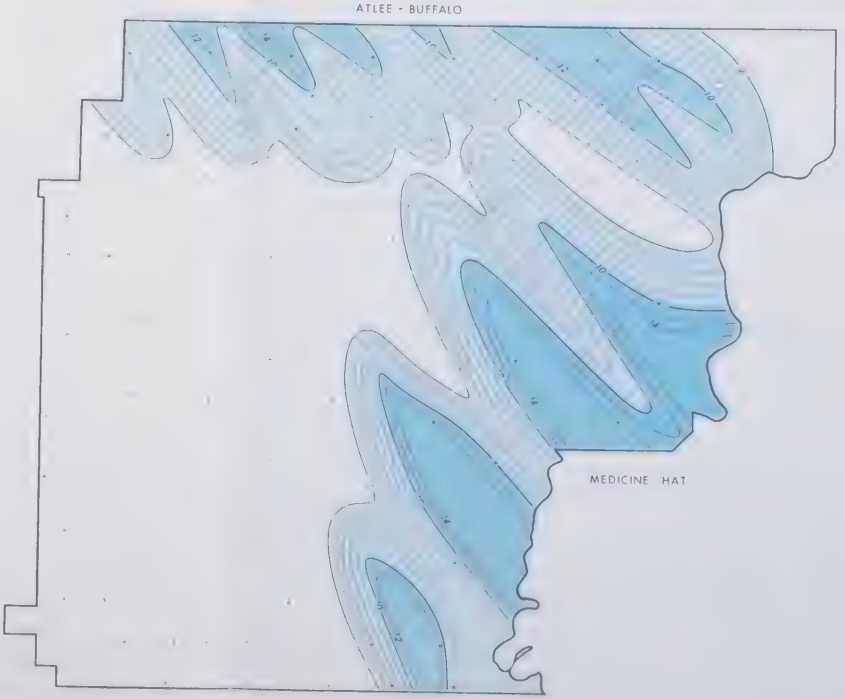
MAP

TIESSEN MAPPING LTD

NOTE

All evaluation wells were drilled through Medicine Hat SS

6-8-17-4 W4



SUFFIELD EVALUATION COMMITTEE

MEDICINE HAT A SANDSTONE
NET PAY ISOPACH
ATLEE / BUFFALO - MEDICINE HAT POOL

CONTOUR INTERVAL 2

MAP B

TIESSEN MAPPING LTD

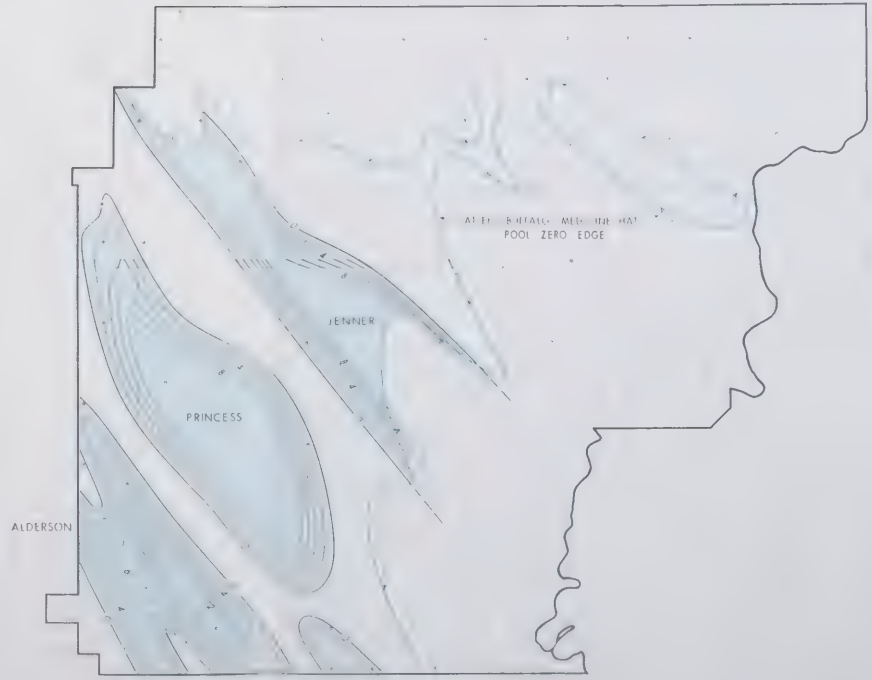
R 8 R 7 R 6 R 5 R 4 R 3 R 2 W 4

NOTE

All evaluation wells were drilled through Medicine Hat SS

6-33-16-7 W 4

MEDICINE HAT A SS



SUFFIELD EVALUATION

MEDICINE HAT A SANDSTONE
NET PAY ISOPACH
ALDERSON - PRINCESS - JENNER POOL

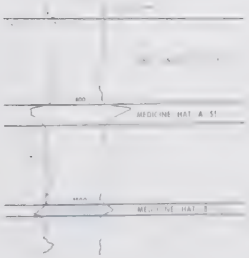
TIESSEN MAPPING LTD

R 9 R 8 R 7 R 6 R 5 R 4 R 3 R 2 W 4

NOTE

All evaluation wells were drilled through Medicine Hat 55

6-8-17-4 W 4



SUFFIELD EVALUATI

MEDICINE HAT B SANDSTONE
NET PAY ISOPACH

MEDICINE HAT POOL

TIESSEN MAPPING LTD

R 9 R 8 R 7 R 6 R 5 R 4 R 3 R 2 W 4

T 18 T 17 T 16 T 15 T 14

SINGLE ZONE AREA
TWO ZONE AREA
UPPER CRETACEOUS MEDICINE HAT

SUFFIELD EVALUATION COMMITTEE

MEDICINE HAT FM. COMPOSITE

MAP 11

TIESSEN MAPPING LTD

R 9 R 8 R 7 R 6 R 5 R 4 R 3 R 2 W 4

NOTE

● Evaluation wells drilled through Second White Specks SS

T 12

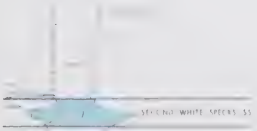
T 11

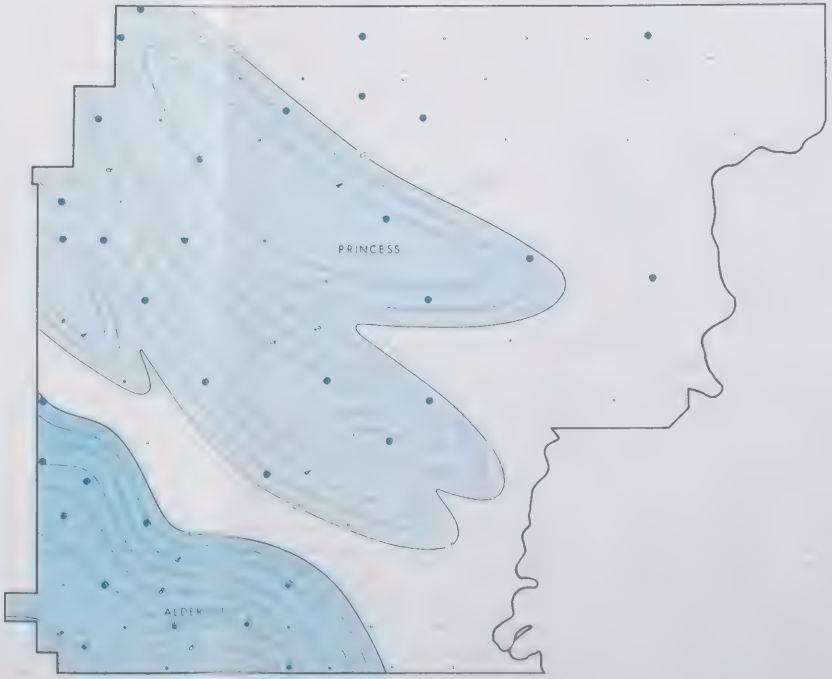
T 10

T 9

T 8

11-11-16-9 W 4





SUFFIELD EVALUATION COMMITTEE

SECOND WHITE SPECKS SANDSTONE
NET PAY ISOPACH
ALDERSON - PRINCESS POOLS

CONTOUR INTERVAL 2

LAST REVISED

TIESSEN MAPPING LTD.

R 10 R 9 R 8 R 7 R 6 R 5 R 4 R 3 R 2 W4

T 21

T 20

T 19

T 18

T 17

T 16

T 15

T 14

NOTE

● Evaluation wells drilled through Bow Island SS

6-10-18-4 W4

2100

BASE FISH SCALES

MISSISSIPPIAN

PRODUCTIVE AREA

PROSPECTIVE AREAS

G/W 480

15

25

OILFIELD EVALUATION COMMITTEE

BOW ISLAND SANDSTONE
PRODUCTIVE &
PROSPECTIVE AREAS

TIESSEN MAPPING LTD

R 9 R 8 R 7 R 6 R 5 R 4 R 3 R 2 W 4

NOTE

● Evaluation wells drilled through Glauconite

T 20

T 19

T 18

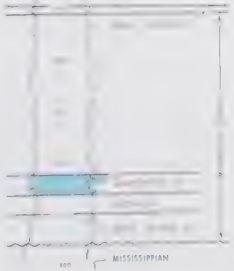
T 17

T 16

T 15

T 14

6-19-18-8 W 4



NET PAY

20

10

ASSUMED G/W - 625

INTERPRETED DEPOSITIONAL EDGE OF GLAUCONITIC SANDSTONE

PRODUCTIVE AREA

PROSPECTIVE AREAS

SUFFIELD EVALUATION COMMITTEE

GLAUCONITIC SANDSTONE PRODUCTIVE & PROSPECTIVE AREAS

MAP 4

TWESSEN MAPPING LTD.

TABLE 1
(cont.)

WELL LOCATION	TOTAL DEPTH	FORMATIONS COMPLETED	POTENTIAL FORMATIONS	STATUS
6-33-16-7	1463	Milk River & Medicine Hat	-	Capped Gas Well
6-13-17-7	2160	Milk River & Second White Specks	Medicine Hat	Capped Gas Well
6-28-17-7	1532	Milk River & Medicine Hat	-	Capped Gas Well
6-12-18-7	1718	Milk River	-	Capped Gas Well
6-21-18-7	1728	Milk River & Medicine Hat	-	Capped Gas Well
6-16-19-7	1889	Medicine Hat	-	Capped Gas Well
10-22-19-7	3010	Medicine Hat & Second White Specks	-	Capped Gas Well
6-32-19-7	1755	Milk River & Medicine Hat	-	Capped Gas Well
6-35-19-7	1650	Milk River & Medicine Hat	-	Capped Gas Well
6-10-20-7	1588	Milk River & Medicine Hat	-	Capped Gas Well
6- 3-15-8	1722	Milk River	-	Capped Gas Well
6-13-15-8	1370	Milk River & Medicine Hat	-	Capped Gas Well
7-15-15-8	1930	Milk River & Second White Specks	Medicine Hat	Capped Gas Well
6-17-15-8	1380	Milk River & Medicine Hat	-	Capped Gas Well
6-30-15-8	2070	Milk River & Second White Specks	Medicine Hat	Capped Gas Well
6- 1-16-8	1610	Milk River & Medicine Hat	-	Capped Gas Well
6- 9-16-8	2213	Milk River & Second White Specks	Medicine Hat	Capped Gas Well
6-33-16-8	1725	Milk River & Medicine Hat	-	Capped Gas Well
6-13-17-8	2340	Milk River & Second White Specks	Medicine Hat	Capped Gas Well
6-17-17-8	1690	Milk River & Medicine Hat	-	Capped Gas Well
6- 4-18-8	2320	Milk River & Second White Specks	-	Capped Gas Well
6-19-18-8	3420	Glauconite	-	Capped Gas Well
6-23-18-8	2345	Milk River & Second White Specks	-	Capped Gas Well
6-12-19-8	2941	Medicine Hat & Second White Specks	-	Capped Gas Well
6-19-19-8	2360	Milk River & Second White Specks	-	Capped Gas Well
6-22-19-8	1678	Milk River & Medicine Hat	-	Capped Gas Well
6- 8-20-8	3256	Medicine Hat & Second White Specks	-	Capped Gas Well
6-12-20-8	1665	Milk River & Medicine Hat	-	Capped Gas Well
11-16-20-8	3264	Glauconite - Non Productive	Medicine Hat	Potential Gas Well
6-12-15-9	2065	Milk River & Second White Specks	Medicine Hat	Capped Gas Well
6-26-15-9	1530	Milk River & Medicine Hat	-	Capped Gas Well
11-11-16-9	2160	Milk River & Second White Specks	Medicine Hat	Capped Gas Well
6-24-16-9	2555	Milk River & Second White Specks	Medicine Hat	Capped Gas Well
6-27-16-9	2150	Milk River & Second White Specks	Medicine Hat	Capped Gas Well
6-10-17-9	2900	Milk River & Second White Specks	Medicine Hat	Capped Gas Well
6-35-17-9	1638	Milk River	Medicine Hat	Capped Gas Well
6-23-18-9	2290	Medicine Hat & Second White Specks	-	Capped Gas Well
6-35-18-9	3026	Milk River & Second White Specks	-	Capped Gas Well

TABLE 2

SUFFIELD EVALUATION DRILLING PROGRAM
DRILLING STATISTICS

STAGE	FORMATION	WHITCO 1			WHITCO 2			TOTALS		
		No. of Wells	Footage	Rig Operating Days	No. of Wells	Footage	Rig Operating Days	No. of Wells	Footage	Rig Operating Days
1	Medicine Hat	3	4,833	9.2	19	28,020	46.5	22	32,853	55.7
1	Second White Specks	5	10,497	17.7	0	0	0	5	10,497	17.7
	SUB TOTAL STAGE 1	8	15,330	26.9	19	28,020	46.5	27	43,350	73.4
2	Medicine Hat	6	10,225	22.7	15	24,812	54.4	21	35,037	77.1
2	Second White Specks	10	21,904	38.9	3	6,448	24.8	13	28,352	63.7
2	Sub Total	16	32,129	61.6	18	31,260	79.2	34	63,389	140.8
		KENTING 35			KENTING 57					
2	Bow Island	1	2,671	4.9	4	9,778	21.1	5	12,449	26.0
2	Basal Colorado	2	6,145	12.9	3	8,867	19.5	5	15,012	32.4
2	Mississippian	6	20,285	64.4	-	-	-	6	20,285	64.4
2	Sub Total	9	29,101	82.2	7	18,645	40.6	16	47,746	122.8
	SUB TOTAL STAGE 2							50	111,135	263.6
	TOTAL DRILLING PROGRAM							77	154,485	337.0

TABLE 3

SUFFIELD EVALUATION DRILLING PROGRAM

RESERVES SUMMARY - BCF

Pool	Map Reference	Proven		Probable		Possible		Total	
		Gas In Place	Sales Gas	Gas In Place	Sales Gas	Gas In Place	Sales Gas	Gas In Place	Sales Gas
Milk River									
A-1 Zone	3	448.34	320.29	112.09	80.08			560.43	400.37
A-2 Zone	4	832.84	594.98	208.22	148.75			1,041.06	743.73
B-1 Zone	5	530.17	378.76	132.55	94.69			662.72	473.45
B-2 Zone	6	420.95	300.74	105.24	75.17			526.19	375.91
Total Milk River	7	2,232.30	1,594.77	558.10	398.69			2,790.40	1,993.46
Medicine Hat									
Atlee Buffalo-Medicine Hat	8	250.73	211.58	62.69	52.90			313.42	264.48
Alderson	9	15.66	10.62			15.66	10.62	31.32	21.24
Jenner	9	15.95	10.91			15.95	10.91	31.90	21.82
Princess	9	20.03	13.48			20.04	13.48	40.07	26.96
Medicine Hat B	10	41.91	35.40	41.91	35.40			83.82	70.80
Total Medicine Hat	11	344.28	281.99	104.60	88.30	51.65	35.01	500.53	405.30
Second White Specks									
Alderson	12	67.98	57.86			22.67	19.28	90.65	77.14
Princess	12	75.73	40.03			75.74	40.04	151.47	80.07
Total Second White Specks	12	143.71	97.89			98.41	59.32	242.12	157.21
Bow Island	13	9.60	7.37			44.08	33.78	53.68	41.15
Glauconite	14	21.81	17.78			134.49	109.65	156.30	127.43
TOTAL BLOCK		2,751.70	1,999.80	662.70	486.99	328.63	237.76	3,743.02	2,724.55

TABLE 4

Comparison of
1972 Sales Gas Forecast for Suffield Block
with
1974 Estimate from Evaluation Drilling Program

Zone	1972 Forecast Sales Gas Reserve BCF	1974 Estimate Sales Gas Reserve BCF	Variance BCF
Milk River	1,855	1,993.46	138.46
Medicine Hat	1,665	405.30	(1,259.70)
Second White Specks	170	157.21	(12.79)
Bow Island	402)	41.15)	
	)-1	)-1	(233.42)
Glauconitic	-)	127.43)	
Total Indicated Reserve	4,092	2,724.55	(1,367.45)

1. Lower Cretaceous combined for comparative purposes.

GOVERNMENT OF THE PROVINCE OF ALBERTA

ALBERTA REGULATION 134/73

(Filed May 23, 1973)

THE MINES AND MINERALS ACT

(O.C. 771/73)

Approved and Ordered,
GRANT MacEWAN,
Lieutenant Governor. Edmonton, May 22, 1973.

Upon the recommendation of the Honourable the Minister of Mines and Minerals, the Lieutenant Governor in Council, pursuant to section 14, clause (c), subclauses (iii) and (iv) of The Mines and Minerals Act, makes regulations in accordance with the Appendix attached hereto, being the Suffield Evaluation Regulations.

HUGH M. HORNER, (Acting Chairman)

SUFFIELD EVALUATION REGULATIONS

1. In these regulations,

(a) "committee" means the Suffield Evaluation Committee constituted by section 3;

(b) "Minister" means the Minister of Mines and Minerals.

2. These regulations apply to that portion of the Province commonly known as the Suffield Block in Townships 17, 18, 19 and 20 in Ranges 3 and 4 and Townships 15, 16, 17, 18, 19 and 20 in Ranges 5, 6, 7 and 8 and Townships 15, 16, 17, 18 and 19 in Range 9, all west of the 4th Meridian.

3. (1) A committee is hereby established with the name of the Suffield Evaluation Committee consisting of three persons appointed by the Lieutenant Governor in Council, to hold office during pleasure.

(2) The Lieutenant Governor in Council may appoint one of the members as chairman and one of the other members as vice-chairman who shall act as chairman when the chairman is absent or unable to act.

(3) Where a vacancy occurs on the committee, the remaining members may exercise all the powers of the committee so long as a quorum of the committee remains in office.

(4) A majority of members constitutes a quorum.

(5) The committee is an agent of the Crown in right of Alberta and its powers under these regulations may be exercised only as an agent of the Crown.

4. (1) Any member who is an employee of the public service of the Province shall serve without remuneration but the other members may receive such remuneration as may be determined by the Lieutenant Governor in Council.

(2) The members are entitled to be paid reasonable travelling and living expenses while absent from their ordinary place of residence in the course of their duties.

5. (1) Subject to these regulations, the members shall administer the business and affairs of the committee and may make by-laws respecting the calling of meetings of the committee and the conduct of

business thereat, the duties and conduct of the members, employees and agents and generally as to the conduct of the affairs of the committee.

(2) The committee may employ such agents, advisers or other persons as it may require from time to time and may determine their remuneration and may incur other expenses in connection with the operations of the committee.

6. (1) The purposes and objectives of the committee are to arrange for and to complete the proposed reserves evaluation drilling program consisting of 77 wells at or about the locations shown on Figure R.C.4 of A Resource Evaluation Study of the Suffield Block dated December, 1972 and prepared for the Province of Alberta.

(2) In order to achieve its purposes and objectives, the committee may do all things that appear to it to be requisite or proper and without limiting the generality of the foregoing the committee may enter into contracts or other agreements for

(a) locating, drilling, equipping, completing, reworking, testing and operating wells,

(b) taking of samples and conducting analyses,

(c) surveying and logging of wells, and

(d) conducting studies of the reserves and other matters relating to evaluation of the gas resources of the Suffield Block.

7. (1) The committee shall

(a) keep full and accurate books of account and records of its operations,

(b) after the end of each year, prepare a report for the Minister summarizing its operations during the preceding year, and

(c) upon completion of the drilling program and evaluation thereof, prepare a final report for the Minister.

(Extract from *The Alberta Gazette*, June 15, 1973)

Printed by the QUEEN'S PRINTER for the
Province of Alberta, Edmonton

Approved and Ordered,

LIEUTENANT GOVERNOR

O.C. 847/73

Edmonton

June 5, 1973

Upon the recommendation of the Honourable the Minister of Mines and Minerals, the Lieutenant Governor in Council, pursuant to section 18, subsection (3) of The Public Service Act, appoints HUBERT HENRY SOMERVILLE as CHAIRMAN of the SUFFIELD EVALUATION COMMITTEE, the said appointment to be effective May 15, 1973.

CHAIRMAN

Approved and Ordered,

LIEUTENANT GOVERNOR

O.C. 848/73

Edmonton

June 5, 1973

Upon the recommendation of the Honourable the Minister of Mines and Minerals, the Lieutenant Governor in Council, pursuant to section 3 of Alberta Regulation 134/73, being the Suffield Evaluation Regulations, appoints

JAMES K. GRAY, and

PHILIP J. DOWLING

as members of the SUFFIELD EVALUATION COMMITTEE, the said appointments to be effective May 15, 1973, and that JAMES K. GRAY is appointed as vice-chairman of the said committee.

CHAIRMAN

Alberta

ORDER IN COUNCIL

APPROVED AND ORDERED,

LIEUTENANT GOVERNOR

O.C. 754/74

April 23, 1974

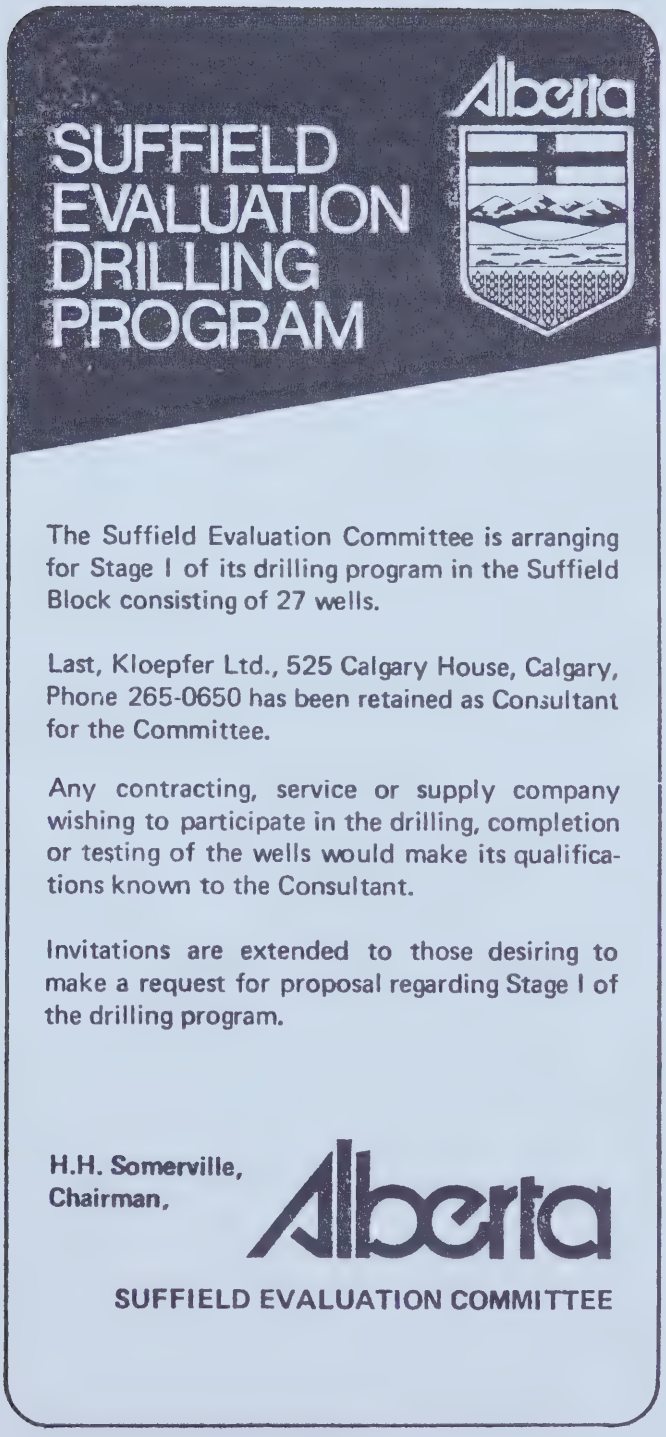
EDMONTON, ALBERTA

Upon the recommendation of the Honourable the Minister of Mines and Minerals, the Lieutenant Governor in Council, pursuant to section 3 of The Suffield Evaluation Regulations filed as Alberta Regulation 134/73,

1. appoints HARVEY L. HOGGE a member of the Suffield Evaluation Committee;

2. amends Order in Council numbered O.C. 848/73 by striking out the name "PHILIP J. DOWLING".

CHAIRMAN


Alberta
SUFFIELD
EVALUATION
DRILLING
PROGRAM
The Suffield Evaluation Committee is arranging for Stage I of its drilling program in the Suffield Block consisting of 27 wells.
Last, Kloepfer Ltd., 525 Calgary House, Calgary, Phone 265-0650 has been retained as Consultant for the Committee.
Any contracting, service or supply company wishing to participate in the drilling, completion or testing of the wells would make its qualifications known to the Consultant.
Invitations are extended to those desiring to make a request for proposal regarding Stage I of the drilling program.
H.H. Somerville,
Chairman,
Alberta
SUFFIELD EVALUATION COMMITTEE

SUFFIELD EVALUATION PROGRAM

CONTRACTS AWARDED FOR STAGE 1

CONTRACT	AWARDED TO
Surveying	Hogg, Munro & Associates Ltd
Drilling	Whitco Drilling Ltd
Tubular Goods	
Casing	Homco International Ltd
Tubing	Franklin Pipe & Supply Ltd
Well Logging	Schlumberger of Canada Ltd
Cement and Cementing Service	Dowell of Canada Ltd
Coring Services	Christensen Diamond Products (Canada) Ltd
Casing Equipment	
Portion	Top-co Industries Ltd
Balance	Halliburton Services Ltd
Wellhead Equipment	Continental-Emsco Company Ltd
Production Packers	Site Oil Tools Ltd
Perforating and Wireline Services	Halliburton Services Ltd
Fracturing Service	Halliburton Services Ltd
Service Rig	Rockwell Servicing Ltd
Testing Equipment and Services	Tharin Petroleum Data Ltd
Concrete Cellars	Stoy Concrete Pipe Ltd
Wellsite Services	Joyline Transport Ltd
Trailer Office Accommodation	Corab Services Ltd

SUFFIELD EVALUATION PROGRAM

CONTRACTS AWARDED FOR STAGE 2

CONTRACT	AWARDED TO
Surveying	J.H. Hogg and Associates Ltd
Drilling	
35 shallow wells	Whitco Drilling Ltd
15 deeper wells	Kenting Petrolia Drilling Ltd
Tubular Goods	Dominion Oilfields Supply Co. Ltd
Well Logging	Schlumberger of Canada Ltd
Cement and Cementing Service	Halliburton Services Ltd
Coring Services	Foothills Diamond Coring Ltd
Casing Equipment	
Portion	Dowell of Canada
Portion	Halliburton Services Ltd
Portion	Import Tool Company Ltd
Balance	Northwest Tool Ltd
Wellhead Equipment	Continental-Emsco Company Ltd
Production Packers	Otis Pressure Control, Inc
Perforating Services	Canadian Perforators Ltd
Fracturing Service	Dowell of Canada
Service Rig	Brooks Field Service Ltd
Drillstem Testing Services	Johnston Testers
Well Testing Service	Burroughs Engineering Ltd
Wellhead Cellars	Consolidated Concrete Limited
Wellsite Services	Oil & Gas Techno Service Ltd

Date Due

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